

Materials & Coatings

Thermal Process Creates Maximum-Strength Highly Ductile Steels in 3 Sec.

SFP Works, LLC, Washington, MI, has developed a globally patented rapid thermal-processing technology, Flash Bainite, that creates what the company describes as maximum-strength steels with unparalleled ductility. The technology requires neither expensive alloying elements nor time-consuming, capital-intensive thermo-mechanical processing.

Flash Bainite in low-carbon alloys reportedly has achieved 265-275 ksi while maintaining 8-9-percent ductility. This mechanical-property combination makes Flash Bainite stronger pound-per-pound than titanium-6Al-4V STA bar, according to company officials, who claim that lean-chemistry dual-phase products with a Flash Bainite/ferrite microstructure have been made that surpass the strength and ductility of commercially available dual-phase steels. The process is said to develop unique mechanical properties never before seen in readily weldable iron-based alloys.

Conventional advanced high-strength steel (AHSS) is heavily cold-rolled, heated to 1350-1600 F for 5 min. in an energy-intensive continuous-annealing oven, water-quenched and oven-tempered for an additional 5 min.

In contrast, this new process rapidly heats the steel to 1350-2400 F within less than 1 sec. using an induction coil or an oxygen/propane multi-point flame. Within a few seconds of reaching peak temperature, the steel is rapidly quenched in room-temperature water. This flash processing, according to company officials, leads to beneficial drastic differences in microstructure when compared to other steels. In addition, thermal energy use is negligible, especially when compared to the large ovens of continuous-annealing lines.

Sheets from 0.040 to 0.160 in. thick, 1-in.-dia. tubing and bar stock from $\frac{3}{16}$ to $\frac{3}{8}$ in. thick have been transformed from dozens of commercially available alloys using the process, and because processing is continuous, it is compatible with many steel forms (coil, bar, plate, structural shapes) and processing practices.

Preformed shapes such as frame rails, roof bows and bumper beams can be processed using Flash Bainite, promising vehicles weighing hundreds of pounds less, according to SFP Works. Other applications include military, since steel processed in this manner reportedly is stronger, harder and more ductile than current steel armor. **SFP Works, LLC: 586/453-4090; www.bainitesteel.com**

New Coating Offers Chrome-Like Finish, Minus the Hexavalent Chrome

American Trim, Lima, OH, a provider of product design, tooling and process development, metalforming, metal finishing, and product/component assembly for the home appliance, transportation, building products and consumer products industries, has taken delivery of a physical-vapor-deposition (PVD) chamber that it will use to apply a base powder coating to metal-alloy parts. The coating, supplied by DuPont CoatingSolutions, Houston, TX, serves as a protective functional layer and smoothes out the surface. Parts then are coated with

a clear acrylic topcoat for protection and durability, resulting in a chrome-like finish without the use of hexavalent chrome.

Designed for decorative finishing in the heavy truck and automotive industries, the PVD process also has found interest from other markets including appliance, recreational vehicle, furniture and building products.

**American Trim: 419/228-1145;
www.amtrim.com**
**DuPont CoatingSolution:
www.dupontpowder.com**

Nonhazardous Corrosion Inhibitor

Workplace cleanliness and environmental safety make Armor Protective Packaging's newest product a natural complement to its current line of corrosion-inhibiting products.

The company, based in Howell, MI, has introduced Metal Rescue, which can safely and effectively remove iron oxide from metal-alloy products in as little as 20 min., leaving the base part and other materials (including the user) unaffected. The nontoxic liquid solution does not contain harmful hazardous acids found in alternative rust-removal systems. The product is noncorrosive, nonflammable, nontoxic, biodegradable and contains no VOCs, solvents, acids, bases or hazardous ingredients.

Water-based, the product is safe for aluminum, brass, copper, chrome, gold, lead, nickel, silver, titanium, tungsten, solder or solder points. Plastic, glass or cloth can be cleaned as well without damage to other materials.

**Armor Protective Packaging:
517/546-1117; www.metalrescue.com**

Coil-Coating Companies Consolidate

Four companies offering coil-coating services have consolidated into a single entity—Metal Coaters—to combine core resources and functions and provide customers with enhanced efficiencies and expanded product offerings, company officials said. The companies: Doublecoat, Metal Coaters of California, Metal Coaters of Georgia and Metal Prep.

The unified Metal Coaters, with headquarters in Houston, TX, operates five production facilities—Rancho Cucamonga, CA; Marietta, GA; Jackson, MS; Memphis, TN; and Houston. The facilities offer a variety of coatings, including polyesters, silicone-modified polyesters, fluorocarbons and plastisols.

**Metal Coaters: 281/897-7788;
www.metalcoaters.com**